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HUGH P. GORTLER			EXAMINER	
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Mission Viejo, CA 92692				
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/751,303

**Applicant(s)**

BLOHOWIAK ET AL.

**Examiner**

CACHET I. SELLMAN

**Art Unit**

1792

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 23 July 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 4-13, 16-21, 23-34, 37-40, 42-45 and 47-71 is/are pending in the application.
- 4a) Of the above claim(s) 47-60 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 4-13, 16-21, 23-34, 37-40, 42-45 and 61-71 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsman's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 7/23/2008 has been entered.

### ***Priority***

2. Applicant's claim for the benefit of a prior-filed application under 35 U.S.C. 119(e) or under 35 U.S.C. 120, 121, or 365(c) is acknowledged. Applicant has not complied with one or more conditions for receiving the benefit of an earlier filing date under 35 U.S.C. 120 as follows:

The later-filed application must be an application for a patent for an invention which is also disclosed in the prior application (the parent or original nonprovisional application or provisional application). The disclosure of the invention in the parent application and in the later-filed application must be sufficient to comply with the requirements of the first paragraph of 35 U.S.C. 112. See *Transco Products, Inc. v. Performance Contracting, Inc.*, 38 F.3d 551, 32 USPQ2d 1077 (Fed. Cir. 1994).

The disclosure of the prior-filed application, Application No. 10/143391, fails to provide adequate support or enablement in the manner provided by the first paragraph of 35 U.S.C. 112 for one or more claims of this application. The '391 application does

not provide support applying a backing film onto the adhesive coated metal to prevent sticking therefore the date for this limitation is 1/2/2004

***Specification***

3. The disclosure is objected to because of the following informalities: Page 6 of the specification contains a misspelled word; "terphthalate (PET)" should be spelled "terephthalate (PET)."

Appropriate correction is required.

4. Claim 24 objected to because of the following informalities: the claim contains a misspelled word; "terphthalate (PET)" should be spelled "terephthalate (PET)."

Appropriate correction is required.

***Claim Rejections - 35 USC § 103***

5. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

6. Claims 4-6, 10-11, and 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zheng et al. in view of Shimizu et al., Dow Product Information (DEN 425 Epoxy Novolac Resin), Edelman, Simons et al. (US 6576316) and Kurtz et al. (US 4946758).

Zheng et al. discloses a process for treating metal surfaces with a composition to prepare the metal for subsequent bonding. The process comprises the steps of cleaning the metal surface by using a caustic solution of sodium hydroxide (see col. 7, lines 15-17); followed by immersion in tap water to rinse the metal surface (see col. 7, lines 18-19); a sol-gel is applied to the metal material (see abstract); evaporating the water

portion of the sol-gel (see col. 7, lines 49-53) and followed by applying an epoxy adhesive (see col. 8, lines 35-42).

Zheng et al. teaches that a primer is optional in order to reduce the chemical activity of the adherent coatings which can absorb contaminants. Since Zheng et al. teaches the optional use of the primer, it is within the scope of Zheng et al. to apply the adhesive directly to the sol-gel coating especially if the chemical activity is at an optimal level to where the contaminants will not absorb.

Zheng et al. does not teach an epoxy based adhesive having a composition as listed in claims 4 and 16. However, Zheng et al. teaches the use of common epoxy adhesives such as EA-9649 which according to WO/1994/026994 consists of epoxy resin of trifunctional aromatic glycidyl ether and epoxidized novolac and a curative 4,4'-diaminodiphenyl sulfone. This adhesive lacks the carboxy-terminated acrylonitrile butadiene rubber as required by claim 4.

Shimizu et al. teaches the application of an adhesive to a metal plate where the adhesive comprises a first epoxy composition and a second composition then the composition is cured by heating the modulus elasticity in tension sufficient to increase the stiffness of the metal (see abstract). Shimizu et al. teaches that the epoxy resins can be glycidyl ether type and can be used alone or in combination with each other depending on the desired physical properties of the epoxy resin composition. The resin includes hardeners that are used to exhibit curing action upon heating such as 4,4'-diaminodiphenylsulfone in amounts between 1-15% by weight of the total epoxy resin (col. 3, lines 32-50). Shimizu et al. teaches that various additives can be used such as

high molecular weight epoxy resins derived from bisphenol A and butadiene acrylonitrile copolymers in the amount of 5-100% by weight which increases the formability of the adhesive (col. 3, lines 57-64). Shimizu et al. teaches the use of 35 parts of bisphenol A type liquid epoxy resin with 50 parts bisphenol A type solid epoxy resin (col. 5, lines 63-66). Shimizu et al. also teaches the use of 10% of carboxyl group containing nitrile rubber (see col. 6, lines 37-40). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the epoxy material of Shimizu et al. using the amounts of the claim through routine experimentation especially absent any criticality in using the claimed range. One would have been motivated to do so because Shimizu et al. teaches that the amount and components of the mixture affected the overall cohesive force, sag, viscosity, and wetting properties of the resin (see col. 3, lines 51-56) therefore one would have a reasonable expectation of success in applying the adhesive to the metal substrate.

Dow Product Information states that novolac resin has higher functionality than standard bisphenol A based epoxy resins and has good thermal stability, mechanical strength and resistance against chemicals. The novolac resin produces a more tightly cross-linked cured system than bisphenol A based liquid epoxy resins.

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the adhesive of Shimizu et al. and use the novolac resin in Dow Product Information. One would have been motivated to do so because both disclose resins that can be used in adhesives and Dow Product Information further teaches the advantages of improved temperature performance,

mechanical strength and resistance to various chemicals when using novolac over epoxies formed from bisphenol A.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the process of Zheng et al. to include applying the epoxy mixture of Shimizu et al. and Dow Product Information. One would have been motivated to do so because both disclose applying epoxy adhesive to a metal substrate and Shimizu et al. further teaches that the adhesive does not have the problem of forming strain and depression in the metal therefore one would have a reasonable expectation of success in applying the epoxy resin.

In regards to applying a thermoplastic backing sheet to the adhesive to protect the metal from sticking to itself, it is known in the art to use such materials when forming materials used for vehicle parts that are being coiled as being taught by Simons et al. (col. 1, lines 10-19, abstract, col. 3 lines 19-24). Simons et al. discloses degreasing a metal strip, applying an adhesive to the strip followed by applying an anti adhesive film which can be formed of a release lacquer to the adhesive coated strip and then coiling the strip. Simons et al. does not specifically teach that the anti-adhesive film is a thermoplastic material, however, it is well known in the art to use such materials especially PET to prevent the sticking of an adhesive to itself when coiling (see Kurtz et al. (US 49476758 col. 16).

it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the process of Zheng et al. to include the use of a backing film in order to prevent the sticking the adhesive during a coiling process of the

metal material as taught by Simons et al. One would have been motivated to do so because both are directed towards using the metal material in automobile parts and Simons et al. teaches an operable way of protecting the metal material until use.

The metal surface can be aluminum, titanium, and steel (see col. 4, lines 1-6 of Zheng et al.) as required by claims 5 and 17. The caustic concentration is 10% (see col. 7, lines 15-17) as required by claim 6. Zheng et al. teaches that the coating is applied at a thickness of about 0.05 – 5 microns, and more typically from 0.1 - 1 micron (50-5000nm or 100-1000nm) see col. 7, lines 57-61 which overlaps the claimed range. See *In re Wertheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976) as required by **claims 10 and 11**.

7. Claims 7-9 and 12-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zheng et al. in view of Shimizu et al., Dow Product Information, Simons et al., Krutz et al. as applied to claims 4 and 16 above in further view of Blohowiak et al.

Zheng et al. teaches that the sol gel is comprised of a metal alkoxide; water, an organoalkoxysilane comprising silane coupling groups capable of bonding with the material to be bonded with the metal surface and an acid which promotes hydrolysis and crosslinking of the metal alkoxide and organoalkoxysilane (see abstract). The metal alkoxides can be made of silicon, aluminum, titanium, zirconium, tantalum and hafium dependent on the type of substrate being used (see col. 4, lines 49-65). Zheng et al. does not teach the combination in claims 12-13. However, it was well known in the art to use zirconium alkoxide, 3-glycidioxy-propyltrimethoxysilane, and glacial acetic acid (see



col. 3, lines 3-10). Blohowiak et al. also reaches that the sol gel mixture can be an organozirconium compound such as tetra n-propoxyzirconium (see col. 4, lines 28-35).

Blohowiak et al. states that the mixture can have surfactants or thixotropic agents in solution to improve the spray characteristics. The surfactants or thixotropic agents help to provide a more uniform sprayed coating and improve the manufacturability of the process. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use a surfactant in the mixtures. One would have been motivated to do so because Blohowiak et al. teaches using surfactants improves the spray characteristics of the solution; provides a more uniform spray coating; and improves the manufacturability of the process therefore one would have a reasonable expectation of success of applying the sol gel.

Blohowiak et al. teaches that use of a zirconium alkoxide will produce a tight bond with oxygen which does not dissociate during operation. The higher the bond strength prevents dissolution of the oxide layer, so that the Zr component in the sol coating functions as an oxygen diffusion barrier as well as a good adhesion bond (see col. 2, lines 37-55) therefore it would have been obvious to one having ordinary skill in the art to use the Zr alkoxide in the process of Zheng et al. in order to produce an oxygen diffusion barrier as well as a strong adhesive bond.

Zheng et al. fails to teach the use of sodium hydroxide at 25% or at the temperature of claim 7-9. However, Blohowiak et al. teaches cleaning the metal substrate using TURCO 5578 at a concentrate of 10-30% at a temperature of 190 (+/- 5) F (See table 6, col. 20, line 45). Blohowiak et al. does not reach that the NaOH

concentration in the caustic solution is 25% but the percentage is within the range of Blohowiak et al. Blohowiak teaches that the alkaline etch produces a roughened surface better suited for adhesive bonding. The concentration of the alkaline solution will affect the roughening of the surface making it a result effective variable. Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the process to include the concentration within the claimed range through routine experimentation in order to achieve the desired roughening of the metal surface especially absent any criticality in using the claimed range.

Blohowiak et al. teaches using such an alkaline cleaning agent results in a mat finish, and shows superior hot/wet durability (see col. 10, lines 19-21) therefore one would have been motivated to modify the process of Zheng et al. to use the alkaline wash of Blohowiak et al. in order to produce a surface having superior hot/wet durability.

8. Claims 19-19 and 61-62 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zheng et al. in view of Shimizu et al., Dow Product Information, Simons et al., Krutz et al. as applied to claims 4 and 16 above in further view of Montano et al.

The teachings of Zheng et al. in view of Shimizu et al., Dow Product Information, Simons et al. and Krutz et al. are as stated above. However, they fail to teach the method in which the adhesive is applied.

Montano et al. teaches a method for treating adhesion promoted metal surfaces with an epoxy resin. Montano et al. discloses a process of roughening a metal surface, applying an adhesion promotion composition to the metal surface then coating it with an

epoxy resin composition (abstract). Montano et al. also teaches that the epoxy resin composition can be applied by spraying, dipping, roller coating, or any suitable method to applying an epoxy resin (see col. 9, lines 41-46).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the process of Zheng et al. in view of Shimizu et al., Dow Product Information, Simons et al., Krutz et al. to include applying the epoxy adhesive using the methods of Montano et al. One would have been motivated to do so because both disclose processes where a metal is coated with an adhesion promotion composition and then coated with an epoxy resin and Montano et al. further discloses an operable way of applying the epoxy resin coating therefore one would have a reasonable expectation of success in applying the adhesive coating to the metal.

9. Claims 20-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zheng et al. in view of Shimizu et al., Dow Product Information, Simons et al., Krutz et al. as applied to claim 16 and in further view of Tola.

The teachings of Zheng et al. in view of Shimizu et al., Dow Product Information, Simons et al., Krutz et al. are as stated above. The references fail to teach applying the adhesive at the claimed thickness.

Tola discloses a method for forming a foil/dielectric laminate by applying an epoxy resin to the foil, baking the adhesive in an oven to remove the solvent in the adhesive, which dries the adhesive and reduces the thickness of the layer to about 0.4 mils. The thickness is a result effective variable, which depends on the curing conditions. It would have been obvious to one having ordinary skill in the art at the time

the invention was made to use the thickness within the claimed range through routine experimentation in order to ensure that the foil is laminated to the dielectric especially since there is no evidence in using the thickness in the claimed range.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the process Zheng et al. as modified above to include applying the adhesive at the thickness as taught by Tola. One would have been motivated to do so because both disclose applying an epoxy to a foil for form a laminate and Tola teaches a process where a laminate is formed using an epoxy applied to a foil therefore one would have a reasonable expectation of success in forming the laminate.

10. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zheng et al. in view of Shimizu et al., Dow Product Information, Simons et al., Krutz et al. as applied to claim 16 above in further view of Poutasse et al.

The teachings of Zheng et al. in view of Shimizu et al., Dow Product Information, Simons et al., Krutz et al. are as stated above but fail to teach using acetone as the solvent in the adhesive.

Poutasse et al. discloses applying an epoxy adhesive to foil to produce a laminate. Poutasse et al. teaches that the adhesive contains a solvent where the solvent can be acetone (column 4, lines 55-59).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the process of Zheng et al. in view of Shimizu et al., Dow

Product Information, Simons et al., Krutz et al. to include the solvent of Poutasse et al. One would have been motivated to do because both disclose processes for applying an epoxy adhesive that contains an epoxy novolac, bisphenol epoxy resin to a foil to make a laminate where the foil is roughened before the adhesive is applied and Poutasse further teaches that the adhesive contains a solvent therefore one would have a reasonable expectation of success in forming the epoxy adhesive.

11. Claims 24-27 and 31-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zheng et al. in view of Shimizu et al., Dow Product Information, Simons et al., Krutz et al., Vaughn, Grylls and Koneieczny.

Zheng et al. in view of Shimizu et al., Dow Product Information, Simons et al., Krutz et al. teaches subjecting a metal material to a caustic solution of sodium hydroxide; rinsing the metal material with water to remove the caustic solution of sodium hydroxide; applying a sol-gel coating to the metal material; evaporating the water portion of the sol-gel; applying a liquid adhesive directly to the sol-gel coating on the metal material wherein the liquid adhesive coating is an epoxy based adhesive coating having an epoxy material comprising about 3-35% by wt. diglycidylether of bisphenol A, about 35-60% by wt. diglycidylether of bisphenol A, about 10-30% by wt. novolac-epoxy and about 5-18% carboxy terminated acrylonitrile-butadiene rubber; and a second curative material (see above rejection of claim 4).

Zheng et al. in view of Shimizu et al., Dow Product Information, Simons et al., Krutz et al. fails to teach grit blasting the metal material with a mixture of fine particles of

aluminum oxide in air and water, wherein the grit has a mesh size of about 180-320 as required by claim 24.

Vaughan et al. discloses a process for cleaning titanium alloy to remove oxide coating. The process includes cleaning the alloy (column 2, lines 17-19) using grit blasting with 50 micron alumina, water rinsing, immersing in a solvent and water rinsing (column 4, lines 34-38).

Grylls et al. teaches a method for coating a turbine airfoil where the airfoil is grit blasted to improve the surface finish. The airfoil can be grit blasted using particles mixed with compressed air and water vapor [0020] where the particles are alumina [0022]. Grylls et al. teaches that pressures and sizes must be controlled to prevent chipping of the surface. The grit size can be smaller than 60 mesh and preferably smaller than 220 mesh [0022].

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the process of Zheng et al. in view of Shimizu et al., Dow Product Information, Simons et al., Krutz et al. to include the grit removal process of Vaughan et al. and grit blasting using water, air and alumina as taught by Grylls et al. One would have been motivated to do so because all teach processes of cleaning a metal substrate using grit blasting, Vaughan et al. teaches that the grit can be removed by water rinsing as is later immersed in solvent which is a step in the process of Zheng et al. in view of Shimizu et al., Dow Product Information,

Simons et al., Krutz et al. and Grylls et al. teaches that by blasting with water vapor, air, and alumina improves the surface finish of the metal as well as prevents chipping of the surface therefore one would have a reasonable expectation of success in cleaning the metal substrate.

Konieczny discloses that grit blasting is used in a variety of manufacturing processes. Aluminum oxide particles of a selected size are directed against a surface to be blasted by compresses air or water. The goal is to create a surface having a roughness within a certain range, which is achieved by varying the size of the alumina grit, and the air pressure (column 1, lines 16-24).

It would have been obvious to one having ordinary skill in the art to modify the process Zheng et al. in view of Shimizu et al., Dow Product Information, Simons et al., Krutz et al. in view of Grylls et al. and Vaughan et al. to include the mesh size of about 280. One would have been motivated to do so because Konieczny teaches that the mesh size is a result effective variable because it controls the surface roughness. Therefore it would have been obvious to one having ordinary skill in the art at the time to use the mesh size within the claimed range through routine experimentation in order to obtain a desired surface finish especially absent any criticality in using the claimed range.

The metal surface can be aluminum, titanium, and steel (see col. 4, lines 1-6 of Zheng et al.) as required by claim 25. The caustic concentration used 10% (see col. 7,

lines 15-17) as required by claim 27. Zheng et al. teaches that the coating is applied at a thickness of about 0.05-5 microns, and more typically from 0.1-1micron (50-5000nm or 100-1000 nm) see col. 7, lines 57-61 which overlaps the claimed range See *In re Wertheim*, 541 F.2d 257,191 USPQ 90 (CCPA 1976) as required by claims 21-32.

12. Claims 28-30, 33-34, and 43-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zheng et al. in view of Shimizu et al., Dow Product Information, Simons et al., Krutz et al., Vaughn, Grylls and Koneieczny as applied above and in further view of Blohowiak et al.

The teachings of Zheng et al. in view of Shimizu et al., Dow Product Information, Simons et al., Krutz et al., Vaughn, Grylls and Koneieczny. Are as stated above.

Zheng et al. teaches that the sol gel is comprised of a metal alkoxide; water, an organoalkoxysilane comprising silane coupling groups capable of bonding with the material to be bonded with the metal surface and an acid which promotes hydrolysis and crosslinking of the metal alkoxide and organoalkoxysilane (see abstract). The metal alkoxides can be made of silicon, aluminum, titanium, zirconium, tantalum and hafium dependent on the type of substrate being used (see col. 4, lines 49-65). Zheng et al. does not teach the combination in claims 33-34 and 43. However, it was well known in the art to use zirconium alkoxide, 3-glycidoxy-propyltrimethoxysilane, and glacial acetic acid (see col. 3,lines 3-10). Blohowiak et al. also reaches that the sol gel mixture can be an organozirconium compound such as tetra n-propoxyzirconium (see co.. 4, lines 28-35).



Blohowiak et al. states that the mixture can have surfactants or thixotropic agents in solution to improve the spray characteristics. The surfactants or thixotropic agents help to provide a more uniform sprayed coating and improve the manufacturability of the process. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use a surfactant in the mixtures. One would have been motivated to do so because Blohowiak et al. teaches using surfactants improves the spray characteristics of the solution; provides a more uniform spray coating; and improves the manufacturability of the process therefore one would have a reasonable expectation of success of applying the sol gel.

Blohowiak et al. teaches that use of a zirconium alkoxide will produce a tight bond with oxygen which does not dissociate during operation. The higher the bond strength prevents dissolution of the oxide layer, so that the Zr component in the sol coating functions as an oxygen diffusion barrier as well as a good adhesion bond (see col. 2, lines 37-55) therefore it would have been obvious to one having ordinary skill in the art to use the Zr alkoxide in the process of Zheng et al. in order to produce an oxygen diffusion barrier as well as a strong adhesive bond.

The metal surface can be aluminum, titanium and steel as required by claim 44.

Zheng et al. fails to teach the use of sodium hydroxide at 25% or at the temperature. However, Blohowiak et al. teaches cleaning the metal substrate using TURCO 5578 at a concentrate of 10-30% at a temperature of 190 (+/- 5) F (See table 6, col. 20, line 45). Blohowiak et al. does not reach that the NaOH concentration in the caustic solution is 25% but the percentage is within the range of Blohowiak et al.

Blohowiak teaches that the alkaline etch produces a roughened surface better suited for adhesive bonding. The concentration of the alkaline solution will affect the roughening of the surface making it a result effective variable. Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the process to include the concentration within the claimed range through routine experimentation in order to achieve the desired roughening of the metal surface especially absent any criticality in using the claimed range.

Blohowiak et al. teaches using such an alkaline cleaning agent results in a mat finish, and shows superior hot/wet durability (see col. 10, lines 19-21) therefore one would have been motivated to modify the process of Zheng et al. to use the alkaline wash of Blohowiak et al. in order to produce a surface having superior hot/wet durability.

13. Claims 37-38, 63-64 and 67-68 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zheng et al. in view of Shimizu et al., Dow Product Information, Simons et al., Krutz et al., Vaughn, Grylls, Koneiczny, and Blohowiak et al. as applied above and in further view of Montano et al.

Montano et al. teaches a method for treating adhesion promoted metal surfaces with an epoxy resin. Montano et al. discloses a process of roughening a metal surface, applying an adhesion promotion composition to the metal surface then coating it with an epoxy resin composition (abstract). Montano et al. also teaches that the epoxy resin composition can be applied by spray coating, dip coating, roller coating, or any suitable method to apply an epoxy resin (column 9, lines 41-46).

14. Claims 39-40, 66 and 70 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zheng et al. in view of Shimizu et al., Dow Product Information, Simons et al., Krutz et al., Vaughn, Grylls, Koneieczny, and Blohowiak et al. as applied above and in further view of Tola.

Zheng et al. in view of Shimizu et al., Dow Product Information, Simons et al., Krutz et al., Vaughn, Grylls, Koneieczny, and Blohowiak et al. fails to teach applying the adhesive at the claimed thickness.

Tola discloses a method for forming a foil/dielectric laminate by applying an epoxy resin to the foil, baking the adhesive in an oven to remove the solvent in the adhesive, which dries the adhesive and reduces the thickness of the layer to about 0.4 mils. The thickness is a result effective variable, which depends on the curing conditions. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the thickness within the claimed range through routine experimentation in order to ensure that the foil is laminated to the dielectric especially since there is no evidence in using the thickness in the claimed range.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the process of Zheng et al. as modified to include applying the adhesive at the thickness as taught by Tola. One would have been motivated to do so because both disclose applying an epoxy to a foil for form a laminate and Tola teaches a process where a laminate is formed using an epoxy applied to a foil therefore one would have a reasonable expectation of success in forming the laminate.

15. Claims 42, 65 and 69 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zheng et al. in view of Shimizu et al., Dow Product Information, Simons et al., Krutz et al., Vaughn, Grylls, Koneiczny, Blohowiak et al. and Tola as applied above in view of Poutasse et al.

Zheng et al. in view of Shimizu et al., Dow Product Information, Simons et al., Krutz et al., Vaughn, Grylls, Koneiczny, and Blohowiak et al. fails to teach the use of acetone as a solvent.

Poutasse et al. discloses applying an epoxy adhesive to foil to produce a laminate. Poutasse et al. teaches that the adhesive contains a solvent where the solvent can be acetone (column 4, lines 55-59).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the process of Zheng et al. as modified above to include the solvent of Poutasse et al. One would have been motivated to do because both disclose processes for applying an epoxy adhesive that contains an epoxy novolac, bisphenol epoxy resin to a foil to make a laminate where the foil is roughened before the adhesive is applied and Poutasse further teaches that the adhesive contains a solvent therefore one would have a reasonable expectation of success in forming the epoxy adhesive.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CACHET I. SELLMAN whose telephone number is

(571)272-0691. The examiner can normally be reached on Monday through Friday,  
7:00 - 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on 571-272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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Examiner  
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